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ABSTRACT

Research in the active-passive verb relation has indicated that there is an interaction between syntactic form and verb semantics among children of preschool age. The present study examines the contribution of active-passive syntax and verb semantics to comprehension difficulty for preschoolers, 6-year-olds, 7-year-olds, and adults. An additional variable is the type of patient (animate or inanimate) in the sentences. Data were examined from the results of a previous passive comprehension study involving a simple picture-cued comprehension test given to 38 preschool children. The subjects had to point to one of two pictures for each of 24 sentences, 12 active and 12 passive. All the children responded correctly to the 12 reversible sentences. However, the results show a significant interaction between syntax and verb type. A verification test was run on 26 7-year-olds, 26 6-year-olds, and 26 college students. All results agreed: both syntax and verb type had a significant effect on reaction time, but there was no interaction between these variables. While the basic finding remains, that children understand action verb passives better than they understand passives with other verb types, more study is needed to determine whether this phenomenon reflects piecemeal acquisition of knowledge or a general difficulty in processing verbs that do not refer to clear actions. (AMH)

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Understanding passives with non-action verbs

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Paper presented at the Seventh Annual Boston University Conference on Language Development, October 8-10, 1982.

Until relatively recently, research on the acquisition of syntactic rules has neglected questions of productivity of the rules in question. The notion that rules might be lexically restricted has been raised with the new interest in the interaction between syntax and the lexicon, and attention has been drawn to the issue of acquisition. Both the passive and dative constructions have at one time been argued to be transformationally derived, and now in some treatments are considered to be lexical rules. There are restrictions on the verbs that can occur in the passive, for instance there is no passive equivalent of

the bottle contained shampoo

cf. *shampoo was contained by the bottle

or even worse

John had a girlfriend

*A girlfriend was had by John

Hence, Baker has argued that the child should be cautious about generalizing rules such as the passive to verbs without first hearing positive evidence from the input that the verbs are permissible in the passive. Unfortunately data on spontaneous production of passive sentences is extremely scarce. For instance, in 18,000 utterances from 3-4 year old children, Wells (1979) reports 19 instances of passive verbs.

Comprehension studies, however, raise a different set of problems. In attempts to control the semantic clues to comprehension, investigators have usually used reversible passive sentences, generally with two animate NP's. For both act-out and picture-cued comprehension, verbs that referred to a clear action were selected for the sentences. As a result, our knowledge of the generality of the active-passive relation was impoverished.

Maratsos, Kuczaj, Fox & Chalkley (1979) studied children's understanding

of passive sentences with either action verbs or non-action verbs eg remember, forget, know, like, miss, see, hear and watch. To examine children's comprehension, they employed two different procedures with the same results. In one procedure they told the child a sentence, eg.

Donald was liked by Goofy.

and then asked "who did it?" While recognizing the pecularity of such a question about a non-action, the authors argued that the question should have been equally peculiar for the equivalent active sentence, but their subjects generally answered the question about the active sentence correctly. Their results reveal a clear interaction between sentence type (active vs. passive) and verb type, with passive sentences containing action verbs being well understood by their 4-5 year old Ss, but passives containing non-action verbs, not being understood. In a second task, the passive sentences were embedded in a story context in which answering a question (eg who really didn't like the other one?) depended upon understanding a crucial sentence eg

The cat was hated by the racoon.

Again, the nine subjects in this study understood the active sentences with non-action verbs better than the corresponding passives. Maratsos et al. argued that children of 4 or 5 years do not therefore have a full knowledge of the passive-active relation. They contend that this relation constitutes one of the major reasons for positing the abstract concepts of logical subject and logical object in English, and children are not able to formulate the relation in such general terms. Rather, the learning of the passive proceeds piecemeal, perhaps operating first on classes of verbs defined by their semantic attributes.

However, this finding of an interaction between syntactic form and verb semantics at 4 years of age can be given an explanation in terms of either competence or performance. It could mean that the passive is learned in a piecemeal

fashion rather than being an all-or-none rule. On that account, once children learn the passive with respect to all the verbs that take it, there should no longer be an interaction between syntax and verb type. On the other hand, perhaps the non-action verbs add to the processing lead of interpreting a passive sentence - the children's attention is diverted to the more difficult verbs and they lose their flimsy hold on the syntax. Since these verbs are understood in the active form, an interactive effect between verb type and passive syntax must be postulated in a processing account. If so, the residue of this interaction might be revealed in a sensitive measure of adult sentence processing.

The present study examines the contribution of syntax (active versus passive), verb semantics (action (eg. hit), non action (eg. watch) and mental (eg. enjoy)) to comprehension difficulty for preschoolers, 6 year olds, seven year olds and adults. An additional variable is type of patient (animate or inanimate) in the sentences. Data were examined from the results of a simple picture-cued comprehension test given to 38 preschool subjects (mean age 3.10) who took a pretest of passive comprehension for a different study. The subjects had to point to one of two pictures for each of 24 sentences, 12 actives and 12 passives. Half of the sentences had animate patients and were therefore reversible, half had inanimate patients. For each sentence type there was a different sample of four action verbs, four non-action verbs and four verbs referring to a mental state. These 38 subjects all responded correctly to 5 or 6 of the 6 reversible passives, hence would be considered to pass the usual tests of passive comprehension. Nonetheless the results reveal a significant interaction between syntax and verb type ($F = 18.39$, $p = 000$).

[Table 1 here]

The children had difficulty with passive forms containing non-action and mental verbs rather than with action verbs. The same children had no difficulty with the active sentences containing non-action verbs, though they did demonstrate a problem with verbs referring to mental states. It is very likely that this difficulty is inherent in using picture-cued comprehension, since young children are not skilled at reading conventionalized depictions of 'amused' or 'remembered'. In fact, a common response to some of our pictures was "There's a boy with a cloud over him and marbles dropping on his head"! Omitting the mental verbs from the ANOVA, the interaction of verb type (action vs. non-action) and syntax is still highly significant ($F = 68.28$, $p = .000$).

26 college students were run in a verification paradigm which measured the time they took to respond 'true' or 'false' to the match of a sentence and a picture. 144 stimulus pairs were balanced for truth/falsity, active/passive, action/non-action/neutral verbs, and animate/inanimate patient. For present purposes, we consider only responses to true sentences. Although syntactic form ($F = 16.53$, $p < .001$) and verb type ($F = 9.48$; $p < .001$) both contributed to processing time, there was no interaction between them ($F = .2$, n.s.) test the possibility that such an interaction might be revealed at some intermediate age, 26 seven year olds and then 26 six year olds were run through a shorter (72 stimulus pairs) verification paradigm. The results were virtually

[Figure 1 here]

identical to the adult data: a significant effect on RT of both syntax and verb type but no interaction between these variables.

[Table 2 here]

Several possibilities remain before concluding that the interaction at age 4 years is a competence phenomenon reflecting the piecemeal acquisition of knowledge, rather than a processing phenomenon. The older subjects were run in

a paradigm that allows for response gradations, but the picture-cued comprehension measure only allows a binary response. Perhaps it is insufficiently sensitive to reveal a contribution of verb type to the processing of active sentences. Like Maratsos et al, we approached this question by examining the errors of less developed children: 29 children (mean age 3:2) who failed to understand reversible passives even with action verbs in the pretest. Removing the difficult mental verbs from consideration, these children did show a main effect of verb type ($F = 6.16$, $p = .019$) but the interaction of syntax and verb type failed to reach significance ($F = 2.96$, $p = .092$). However inspection of the means in Table 3 does not suggest that these subjects had extra difficulty with the non-action verbs in active sentences. The interaction may fail to be significant because of the overall greater variability for these subjects. Furthermore, since the pretest was not designed for this purpose, the verbs were a different sample for the passive and active forms, so these data can be criticized on methodological grounds. Maratsos et al's data on the same verbs is passive and active versions constitute a clearer demonstration of the effect, and their younger subjects continued to show the interaction. Nevertheless, the possibility exists that the interaction is an artifact of using a task insufficiently sensitive to detect differences in processing the active sentences. Hence we are exploring the feasibility of extending the verification paradigm to 4 year old subjects and examining the latency of response to the match of sentence and picture, with the same verbs appearing in active and passive forms.

The basic finding remains intact: children understand action verb passives better than they understand passives with other verb types. The comprehension measure alone is inadequate to determine whether this phenomenon reflects a differential time course of the acquisition of knowledge or a general difficulty in processing verbs that do not refer to clear actions. However, from the age of six years on, there is no interaction between syntax and verb type in sentence processing.

Table 1

Children's comprehension (N=38, mean age = 3:10)

Verb:	Action		Nonaction		Mental	
Object:	An	Inan	An	Inan	An	Inan
PASSIVE SENTENCES	89.5	91.0	63.5	83.0	86.0	70.0
ACTIVE SENTENCES	86.0	87.0	99.75	99.6	66.0	67.0

Table 2

Verification task standardized RT scores

ANOVA results	Adult (N=26)	7 year olds (N=26)	6 year olds (N=26)
syntax	F=16.58, p=.001	F=9.26,p=.005	F=3.82,p=.062
verb type	F=9.48,p=.000	F=4.29,p=.019	F=4.15,p=.021
object type	F=58.23,p=.000	F=73.28,p=.000	F=12.34,p=.002
syntax x verb type	F=.12, nonsig.	F=1.75, nonsig.	F=.06, nonsig.
verb type x object	F=5.54, p=.008	F=2.32, nonsig.	F=.56, nonsig.

Table 3

Children's comprehension (N=29, mean age 3;2)

Verb:	Action		Nonaction		Mental	
Object:	An	Inan	An	Inan	An	Inan
PASSIVE SENTENCES	55.0	74.0	33.0	69.0	46.5	53.5
ACTIVE SENTENCES	79.5	93.0	76.0	91.5	58.5	67.0

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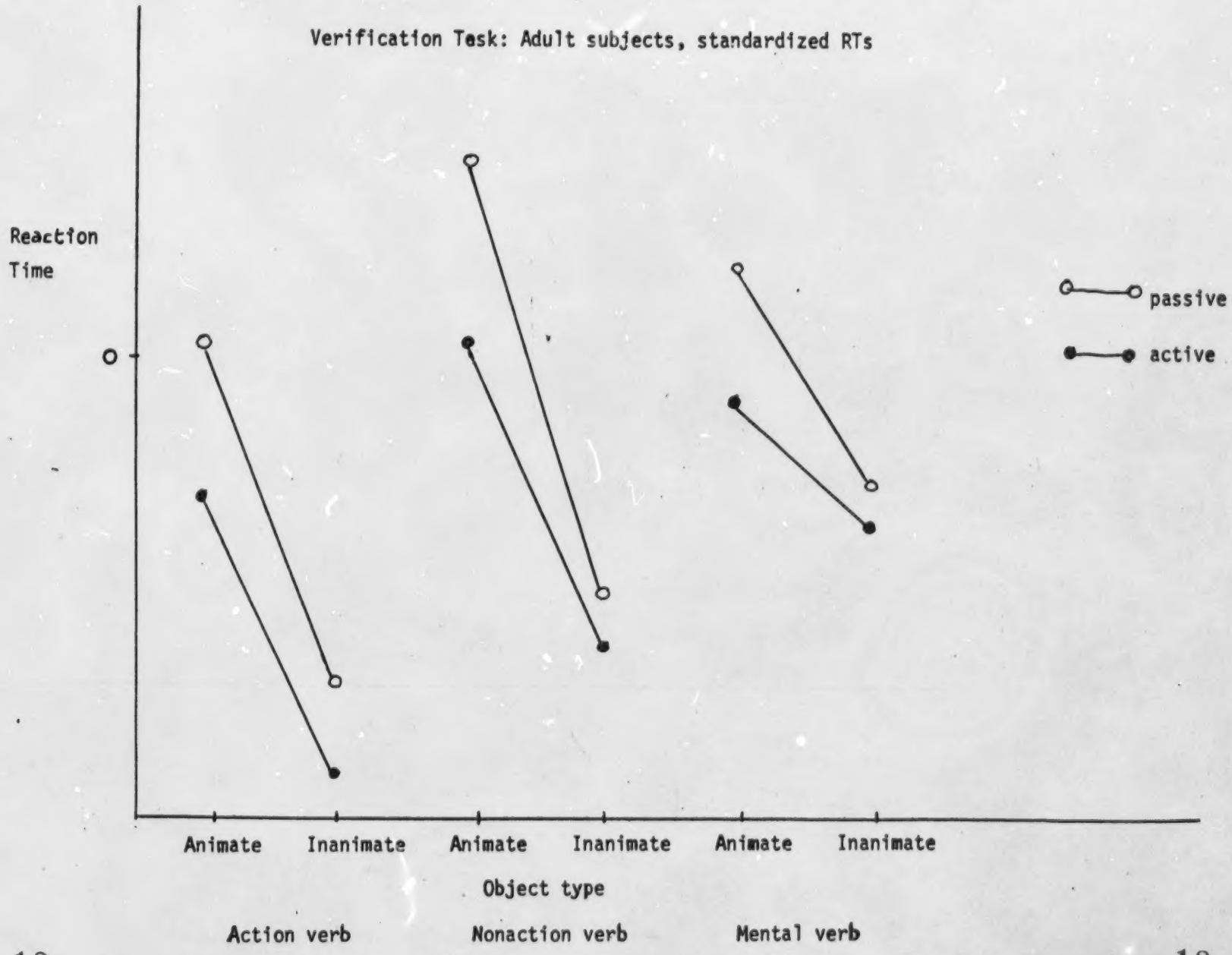
Figure 1


Verification Task: Adult subjects, standardized RTs
Reaction Time
0
passive
active
Animate
Inanimate
Animate
Inanimate
Animate
Inanimate
Object type
Action verb
Nonaction verb
Mental verb